

## **REMARKS**

Claims 11 and 13 have been canceled. Thus, claims 1, 2, 7-10, 12, 14 and 15 are pending in the present application for further prosecution. Claim 1 has been amended to further distinguish over the prior art of record. No new matter was added. Accordingly, Applicants respectfully request reconsideration of the rejections and respectfully submit that claims 1, 2, 7-10, 12, 14 and 15 are in condition for allowance.

### **I. Claim Rejection – 35 USC §112, First Paragraph**

- A. In the non-final Office Action dated June 10, 2011, claim 13 is rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement.*

Claim 13 has been canceled. Accordingly, Applicants respectfully submit that this rejection can be withdrawn as being moot.

- B. In the non-final Office Action dated June 10, 2011, claims 1, 2 and 7-15 are rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement.*

In the Office Action, it is stated that the “claim(s) contains subject matter which was not described in the specification in such a way as to enable one skill in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.” It is also stated that “it is unclear how the applicant arrived at 8N or 9N purity given the chemical analysis of Table 1 of the instant specification.” Still further, it is stated “it is unclear how the 8N purity is obtained and what applicant defines as 8N based on concentration of elements since the total impurities from Table 1 is below detection limit.”

Ultra purity copper having a purity of 8N (99.999999wt%) or higher is disclosed in the present application, as filed, on: page 2, lines 21-22; page 3, lines 23-24; page 4, lines 20-23; and

page 8, line 25. “Weight percent” (wt%) and parts per million (ppm) are terms/units of measurements well known by one of ordinary skill in the art, and these terms as used in the present application are given their traditional meaning. Thus, one of ordinary skill in the art understands the limitation requiring a copper material of 8N purity and no further explanation is submitted as being necessary for purposes of enabling this limitation recited in the claims. Accordingly, Applicants respectfully submit that the specification and claims fully comply with the requirements of 35 USC §112, first paragraph, including the written description requirement.

Further, the method used to produce copper having 8N or higher purity is fully disclosed on page 4, lines 2-28. Also, see page 5, line 7, to page 7, line 13, of the present application, as filed. Thus, one of ordinary skill in the art is clearly taught the method used to produce ultrahigh purity copper having 8N or higher purity.

Table 1 on page 6 of the present application, as filed, is provided for purposes of providing a comparison of impurity element contents in copper of 4N and 6N purities relative to the present invention. The impurity values for the 4N copper listed in Table 1 are the impurity contents of the raw material from which Example 1 of the present application is ultimately produced. For example, see page 5, lines 8-9, of the present application, as filed. It should be noted that exact values were measured and are provided for the 4N raw material copper.

The values for the 6N copper listed in Table 1 of the present application merely relates to values experienced with “conventional 6N copper”. See page 5, lines 9-10, of the present application, as filed. These values are not the result of measurements; rather, these are values typically experienced with such a level of purity. Note that most values are shown in the form of “not greater than” a stated amount of ppm. Again, this is not the result of a direct measurement of a specific sample; rather, it merely reflects what one would expect from such a sample. The “not greater than” symbol does not necessarily refer to a detection limit.

Similarly, the values stated for the 8N to 9N Copper of the present invention listed in Table 1 of the present application are shown in the form of “not greater than” a stated amount of ppm. Thus, since these values can vary, the information provided is with respect to the element not being present at or above a listed threshold value. The “not greater than” symbol does not necessarily refer to a detection limit.

For purposes of example, the Al content in the raw material 4N copper was measured at 0.2 ppm. The Al content of conventional 6N copper is 0.004ppm. The Al content in the present invention is no greater than 0.001. This is not to say that the Al content is 0.001ppm or that it is 0.00099ppm. Rather, Table 1 simply provides information that Al content will not reach and exceed 0.001ppm Al. Nothing further should be read into this information. The total amount of impurities for the 8N to 9N sample will be no greater than 0.01ppm. The threshold values in Table 1 do not alter this.

Moreover, Table 1 of the present invention is not comparable to the information provided by Table 1 of the Fujiwara et al. publication. Fujiwara et al. disclose content values of Ag and Si of 0.011ppm and 0.023ppm, respectively. (These are not stated threshold values; rather, they represent actual measured values.) Thus, these two elements of Fujiwara et al. total 0.034ppm independent of other elements and independently exceed the 0.01ppm total threshold which is mathematically required to arrive at 8N purity. In the present application, the 8N purity copper contains 0.01ppm or less impurities (see page 4, line 23) and Table 1 merely discloses an upper threshold value for each listed element. It is not proper to total the upper threshold values to arrive at a total amount of impurities.

Accordingly, Applicants respectfully submit that a written description of the claimed invention is provided in the present application, as filed, and that the present application and

claims fully comply with the requirements of 35 USC §112, first paragraph. Applicants respectfully request reconsideration and removal of the rejection.

## **II. Claim Rejection – 35 USC §102(e)**

*In the non-final Office Action dated June 10, 2011, claims 1 and 7 are rejected under 35 USC §102(e) as being anticipated by U.S. Patent No. 7,507,304 B2 of Okabe et al.*

The present application is the U.S. national phase of International PCT Patent Application No. PCT/JP2005/000015 filed on **January 5, 2005**. The international application has a claim of priority to Japanese Patent Application No JP 2004-020850 filed on **January 29, 2004**.

The Okabe et al. patent issued on March 24, 2009 and was published as U.S. Patent Application Publication No. 2005/0285273 A1 on December 25, 2005. Thus, the Okabe et al. U.S. patent and U.S. patent application fail to qualify as prior art under 35 USC §102(a) and (b). In addition, since the U.S. patent of Okabe et al. is the national phase of an International PCT application filed after November 29, 2000 and the WIPO publication of the International PCT application was not in the English language, the Okabe et al. U.S. patent and U.S. patent application publication **is afforded no §102(e) date under the statutes and cannot be cited as prior art under §102(e)**.

Thus, Applicants respectfully request that this rejection be withdrawn since the Okabe et al. U.S. patent fails to qualify as prior art relative to the present application.

With respect to International PCT Patent Application No. PCT/JP2005/000015 of Okabe et al., it was published by WIPO as WO 2004/046415 on June 3, 2004. Thus, WO '415 fails to qualify as prior art under §102(b) and is not afforded a §102(e) date for the same reasons

discussed above for the Okabe et al. U.S. patent. However, WO '415 may qualify as prior art under 35 USC §102(a).

For this reasons, Applicants respectfully submit a full verified English language translation of the priority document (Japanese Patent Application No JP 2004-020850 filed on January 29, 2004) of the present application. The priority document pre-dates the publication date of WO '415 and provides the identical disclosure as the present application. Thus, all claims of the present application are fully supported by subject matter disclosed in the Japanese priority document.

Applicants respectfully submit that this rejection should be withdrawn.

### **III. Claim Rejection – 35 USC §103(a)**

*A. In the non-final Office Action dated June 10, 2011, claims 1, 2 and 7-12 are rejected under 35 USC §103(a) as being obvious in view of the 1995 publication of Fujiwara et al. titled “Ductility of Ultra High Purity Copper”*

The 1995 Fujiwara et al. publication is directed to a study of the ductility at elevated temperatures of a copper rod of 3N purity as compared to copper rods of 6N and so-called “8N” purity. Only these three copper rod samples (3N, 6N and so-called “8N” samples) are discussed throughout the publication. In addition, the publication identifies sulfur content in the Abstract as follows: “6N and 8N copper have nearly same sulphur content of about 0.015 ppm.” On page C7-296, Fujiwara et al. provide a chemical analysis of the three samples in Table 1 and sulfur is 0.014 ppm for the “6N-Cu” and 0.015 for the so-called “8N-Cu” sample (which clearly fails to meet or make obvious the limitation recited in claim 14 of the present application).

As discussed in Applicants’ previous response, Japan Energy Company (which was the name of the Assignee of the present application at the time of publication of Fujiwara et al.)

supplied the 6N and so-called “8N” copper rod samples. For example, see the last three lines of page C7-295 and the “Acknowledgement” section on page C7-300 of the publication.

As previously argued by Applicants, it should be clear that the authors of Fujiwara et al. referred to the so-called “8N” sample as being copper of 8N purity; however, this is not accurate. The sample was actually of 7N5 purity at most and the author’s of Fujiwara et al. merely rounded it up to 8N to suit their purposes. This is readily appreciated by careful study of the chemical analysis of the so-called “8N-Cu” sample in Table 1 of the publication. Here, it is not necessary to consider values for elements provided in the form of “less than” a stated value. Rather, only the measured and clearly stated values can be used.

According to the chemical analysis provided by Table 1 of Fujiwara et al., the total amount of Ag, Al, Si, Ti and Fe as impurities in the so-called “8N” sample is 0.043 ppm (0.0000043%). Thus, the purity of this sample, to be precise, is 99.9999957% (7N5) at most and this assumes all other impurities are zero which is entirely unrealistic. For example, it is common technical knowledge to one of ordinary skill in the art that the concentration of Cr, Mn and As and like elements as impurities of Cu cannot actually be reduced to zero. Accordingly, the so-called “8N” sample of Fujiwara et al. clearly fails to disclose the purity requirement of the claims of the present application.

Further, claim 1 of the present application requires a residual resistance ratio of 40,000-100,000. Fujiwara et al. fail to disclose this limitation. While residual resistance ratio may generally be an indicator of the purity of a high purity metal, it is also known by one of ordinary skill in the art that residual resistance ratio change, for instance, depending upon “annealing conditions” and the “physical size” of a sample in addition to the type and concentration of trace amounts of impurity elements remaining in the high purity metal. Thus, while residual resistance ratio depends to some extent on purity, it is not a value that is a direct reflection of purity.

Other characteristics of a material may also have an effect on residual resistance ratio. By way of example, on page 106, right column, of a 1998 article of Yasushi Nitsu titled “Tensile Test of Serially Poly-Crystallized Nb Web” (see IDS filed herewith), the following is described:

“The residual resistance ratio (RRR) is the ratio of electric resistance at room temperature and electric resistance immediately before entering the superconductive state, and takes on a great value when the crystal defects and crystal grain boundary are small.”

In other words, when the residual resistance ratio is great, it will affect the existence of crystal defects (rearrangement, pores, etc.), and it means that there will be few crystal defects. Accordingly, even if the purity of two samples is of a similar level, it does not necessarily mean that the same level of residual resistance ratio can also be obtained.

The sputtering target of the present invention having a residual resistance ratio of 40,000 to 100,000 has few crystal defects, and yields superior effects of being able to inhibit the generation of particles when the material is provided in the form of a sputtering target during sputtering. With respect to this point, Fujiwara et al. fail to disclose or even suggest residual resistance ratio or the structure of a sputtering target. Thus, the present invention should not be considered obvious from the Fujiwara et al. publication.

In addition, the ultra high purity copper (8N or higher) of the present invention additionally yields unexpected results in comparison to the ultra high purity copper (7N5) of Fujiwara et al. such as being able to increase the RRR and reduce the number of generated particles in addition to simply being able to increase the purity. Accordingly, the ultra high purity copper possesses unexpected advantages over Fujiwara et al. and is not obvious from the Fujiwara et al. publication.

For all the above reasons, Applicants respectfully submit that claims 1, 2, 7, 8 and 12 are patentable and not obvious in view of the Fujiwara et al. publication. Accordingly,

Applicants respectfully request reconsideration and removal of the rejection of claims 1, 2, 7, 8 and 12 as being obvious in view of the Fujiwara et al. publication.

*B. In the non-final Office Action dated June 10, 2011, claims 1, 2, 7-11, 14 and 15 are rejected under 35 USC §103(a) as being obvious over Fujiwara et al. in view of U.S. Patent No. 5,206,430 issued to Itoh et al.*

Itoh et al. disclose means for purifying cinnamic acids via adsorption based on activated carbon (see Abstract of Itoh et al.). Itoh et al. further teach that the amount of activated carbon required for purification depends on the residual amount of the catalytic component to be adsorbed (see column 3, lines 54-65). The catalytic component disclosed by Itoh et al. is “heavy metal” (see column 1, line 57, to column 2, line 3). According to the Examples disclosed by Itoh et al., the purity of the purified cinnamic acid is 98.8%.

Nonetheless, Itoh et al. fail to teach that the purity can be controlled to a desired level by changing the additive amount of the activated carbon. Thus, it would not be obvious to a person of ordinary skill in the art to believe that it would be possible to achieved 8N copper by applying the technology taught by Itoh et al. (removal of heavy metals from cinnamic acid using activated carbon to achieve only 98.8% purity level) to the high purification technology of copper (in which the impurity elements to be eliminated are mainly light metal and the degree of purification required by the claims of the present invention is 99.999999%).

As described above, the ultra high purity copper (8N or higher) of the present invention yields unexpected results in comparison to the ultra high copper (7N5) of Fujiwara such as being able to increase the RRR and reduce the number of generated particles in addition to simply being able to increase purity. Thus, Applicants respectfully submit that subject matter claimed by the claims of the present application is unobvious over the teachings of Fujiwara et al. in view



of the Itoh et al. patent. Applicants respectfully request reconsideration and removal of the rejection.

#### **IV. Conclusion**

In view of the above amendments and remarks, Applicants respectfully submit that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

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